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LAND SPECULATION.¹

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Speculation Defined and Described.—In his essay on the "Human Understanding" the great English philosopher, Locke, called attention to the fact that our discussions are very frequently unprofitable because we attach different meanings to our terms. A word is a sign of an idea, but, if to you it is a sign of one idea and to me a sign of a different idea, we are talking about different things when we think we are talking about the same things.

It is well to bear all of this in mind when we discuss speculation in general or land speculation in particular. Perhaps there is no economic term so frequently used to which a greater variety of meanings is attached, and, furthermore, these meanings lack sharp lines of demarcation. A little questioning by a modern Socrates would involve almost anyone of us in worse confusion and more self-contradiction than the ancient Greeks were in when put to confusion by the wisest of all their philosophers.

As the term speculation is a legal, as well as an economic term, it is natural to turn to law dictionaries to see what light they may throw upon the idea. In Bouvier's Law Dictionary, the word is not found, while in Black's Law Dictionary, the following is all that is given:

Speculation. In commerce, the act or practice of buying lands, goods, etc., in expectation of a rise of price and of selling them at an advance, as distinguished from a regular trade, in which the profit expected is the difference

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between the wholesale and retail prices, or the differences of price in the place where the goods are purchased, and the place where they are to be carried for market.—Webster.

If we consult the Century Dictionary, which makes special claims for the excellence of its treatment of legal terms, we find the following:

The investing of money at a risk of loss on the chance of unusual gain; specifically buying and selling, not in the ordinary course of commerce for the continuous marketing of commodities, but to hold in the expectation of selling at a profit upon a change in values or market rates. Thus if a merchant lays in for his regular trade a much larger stock than he otherwise would because he anticipates a rise in prices, this is not termed speculation; but if he buys what he usually does not deal in, not for the purpose of extending his business, but for the chance of a sale of the particular articles for a profit by reason of anticipated rise, it is so termed. In the language of the exchanges, speculation includes all dealing in futures and options, whether purchases or sales.

"The establishment of any new manufacture, of any new branch of commerce, or of any new practice in agriculture, is always a speculation from which the projector promises for himself extraordinary profit." Adam Smith, "Wealth of Nations," I. x. 1.

If we test these definitions by applying them to land speculation we observe that we must look further to find any very helpful notions as to this idea, speculation, so far as the land is concerned. The definitions would exclude from the class of speculators any individual or company buying land regularly at wholesale, even in hundred thousand acre tracts and selling it at retail, no matter what might be the difference between price paid and price received, no matter what the nature of the operations otherwise, no matter how injurious on the whole might be the operations of the wholesale dealer in land. Yet most thoughtful people would regard such a dealer as the type of a very bad kind of land speculators. On the other hand, the definition given in Black's Law Dictionary, would place among speculators the school teacher who should buy a single lot in a city, gradually paying for it out of his earnings, and using it thus as a kind of savings bank, if he made the purchase in the expectation of an increased price and selling it at advance. The teacher might be holding it anticipating correctly that in two or three years a better utilization of the land than the present would appear, in the meantime, paying taxes and special assessments and thus helping to bring it into its appropriate use.

The Century Dictionary, however, brings into its definitions, one or two ideas which we all recognize as playing a part in what we properly designate as land speculation. These ideas are large risks, danger of unusual loss and hope of large gain. When we, perchance,

speak of investment in land as socially desirable, while warning men and especially women against speculation in land, in other words, when we say, invest in land, but don't speculate in land, we have in mind just these ideas.

Mr. A. Barton Hepburn, of the Chase National Bank of New York, has an article in the *American Magazine* for November, 1919, entitled "Don't Speculate and Don't Listen to 'Tips' on Stocks," in which he defines as follows investment in stocks and distinguishes it from speculation. "Investment is buying stocks after the value is proved. Speculation consists in trying to guess what the value will be." And then he adds these wise words: "buying stocks on the prospect of a company striking oil or discovering gold is like betting that you will find money on the sidewalk." If we substitute the word land for stocks, in Mr. Hepburn's definition we shall have made some progress in determining what speculation is, but we shall not have done more than taken the first steps in our quest.

It is interesting to see in what ways the term speculation is employed when it is used in regard to the land. Generally speaking, the prudent purchase of land is a better investment for the ordinary man than stocks and bonds, because in the former case he does not pit his judgment against the machinations of a board. For example, you buy some stock. You know some of the facts with regard to the stock, but you cannot know all the facts which are known to the president and the board of directors, even supposing they are honest and do not want to swindle anyone. But, if they do not want to be honest, the buyer is playing with dice loaded against him. If you call attention to the fact that women may well make investments in land, but say that they must avoid speculation in land, because where speculation is involved the risks become great, what do you mean by speculation? If you consider the thing from the standpoint of the individual you mean not to seek high gains, but to buy land where the values are established, where the returns are small, but comparatively safe; you mean not to go out into the districts where the value depends on future developments that are always more or less uncertain.

This is a case in which speculation is used merely from the point of view of the safety of the individual making the investment. It does not imply necessarily that the one who governs his purchase by the advice just mentioned is ethically better than the one who goes to the outskirts of a city. Perhaps in a given concrete case the latter is rendering a greater service than one who buys at the center of the town.

Probably the ordinary man when he speaks of land speculation thinks of it as *mere* buying and selling without the contemplation of other changes than time changes, more or less great. When other elements enter in, like the erection of buildings upon the land, the operation would cease to be regarded as *mere* speculation. If the buildings were constructed to satisfy an apparent social need and were sold at a reasonable profit, the ordinary man would think of it as an investment of capital, so far as the buildings are concerned, even if he regarded the purchase of the land as speculative. However, there are all sorts of shadings in the popular mind in the meaning attached to the terms speculation and investment. When the transaction of buying the land and putting improvements on it apparently involve no large profits, the term investment would ordinarily be employed.

Sometimes we employ adjectives to bring out more clearly the idea that we have. When we use the words, mere buying and selling, mere speculation, a certain reproach is implied. The implication is that the mere buyer and seller, the mere speculator, seeks simply his own advantage and does not aim to make a return for the gain he seeks. If we go beyond this condemnation, negative in character, to positive wrong committed, we have in mind the man who passes from carelessness with respect to the interests of others to conscious exploitation. This is speculation of an admittedly bad sort and implies absence of consideration of private interests and also of public interests. The dishonest real estate man whose limitation of exploitation is found in his fear of the criminal code is one type of a bad speculator; one happily becoming less common as the real estate business gradually takes on more and more a professional character.

The buyer and seller of land who is abreast of the ethical sentiment of the day emphasizes the service idea and endeavors to square his conduct by this idea. He, however, may recognize service where others less experienced, may not perceive it. Often it may be hard for the observer to draw the line in particular cases, especially as the ultimate purpose in buying and selling may not be disclosed at once.

We have, then, so far in our discussion discovered that in the popular mind there may be a distinction between speculation, *mere* speculation, and bad speculation. Would we find a general recognition of speculation as normally and regularly good speculation? Doubtless when we use the term in general and especially when we use it as applied to land, it would attract attention if we should say "the good speculator."

Land Speculation Contrasted with Speculation in Commodities.—When we come to movable goods, speculation may include place changes, as well as time changes. Commodities may be bought for anticipated time changes, and they may be bought in order to transfer them from a place where less needed to a place where more needed.

Professor Alfred Marshall distinguishes between speculation in goods and speculation in land. In the case of goods he says that speculation may increase the supply of a particular kind of goods, for which there is special need and thus divert capital and labor to supply more pressing rather than less pressing social needs. He says of the supply of land, however, that speculation does not increase it, because it is given once for all. This is true in the abstract and in general, but not in the particular and in the concrete. The speculator may open up new land, as he has done in the United States, where he has opened up a good deal of the land; where now probably by far the greater part of the land is being brought into use through the joint efforts of the settler and the speculator. The speculator may and sometimes does render a service. He does so when he searches for good land, when he opens it for settlement undergoing expenses that the settler alone and unaided could not defray and when he brings the settler to better land than he would himself probably select. The task of doing this well generally requires experience and special skill and is often onerous and expensive; and, if well done, it is both an individual and social service. This is what the good colonizer does whether an individual, a company, or a public body as a state. We have to do with necessary expenses, a necessary supply cost, to use the economic term. The only question is, who shall perform the service, the state (using the term in its generic sense, as meaning a public body) or some private individual.

Furthermore, speculation may and does increase the supply of particular kinds of lands, *e.g.*, irrigated lands, apple orchard lands, grape lands, city lots and, as a consequence, dwellings.

Speculation in the Economic Sense.—Let us now turn from questioning of the man on the street to economics. John Stuart Mill gives a description and defense of speculation in what might be called the strictly economic sense. The speculator, as described by Mill, performs a real service. He studies carefully movements of supply and demand and, if he is qualified for his social task, he is able on the whole and in the long run to look a little further ahead than others. He sees that the supply of particular commodities is inadequate, and he purchases at one time or place in order to carry the goods over to

another time or to transport them to another place. Mill thinks chiefly of the time element. Buying now he raises prices with the result that people begin to be more economical in their consumption with the further result, however, that later on the prices are lower than they would be otherwise. He spreads scarcity over longer periods because people begin saving sooner than they would otherwise and much suffering may be prevented thereby. But, on the other hand, the speculator may perceive that the supply is likely to prove greater than people suppose and scarcity less and by present selling at lower prices he may enable people to consume more fully and over a longer period. The factors are extremely complex and the speculator stakes his own money on his foresight. This is more than mere guessing foresight, because it is based upon a careful study of all the factors involved and in modern times involves statistical calculations, plotting of supply and demand and price curves, etc. This is regarded as regular legitimate economic speculation and is a true social service. It may involve the storage of food articles, and cold storage, in fact, when a part of true legitimate speculation increases our food supply.

We observe that in economic speculation cornering the market and any form of monopolization are excluded. When we go on further to the possible destruction of part of the supply of commodities to maintain or boost prices we get into a different field altogether, for in such cases we are destroying and not conserving the means of life.

It is clear on reflection that speculation in the economic sense, in other words, good speculation has a somewhat larger rôle in the case of movable than in the case of immovable wealth or real estate; yet the more carefully and analytically one examines into land speculation, the more clearly one sees that it may play a useful rôle.

We shall make progress if we take another approach and travel along a different route. We are talking about buying and selling goods of a certain kind when we speak of speculation and these goods are the objects of private property: or to speak more colloquially, we are talking about buying and selling property. Land is property. It must be owned and in modern civilized society, it is for the most part privately owned. In itself, the transfer of landed property is desirable. It is in itself of no social concern that *A* buys the land that *B* owns. Just considered as a transfer of ownership, society is made thereby neither richer nor poorer. But we consider that we have made progress by removing ancient burdens on the transfer of property and introducing what is called free trade in land, making it almost as

easily bought and sold as commodities in general. The theory is that through free purchase and sale, land and other economic goods get into the hands of those who can best use them; and these are normally the ones who can buy and hold at highest prices. Unless we are prepared to go over to socialism, someone must own the land. I buy a vacant lot in a city anticipating an increase in value. Have I injured anyone? Perhaps you sold me this lot and thereby I transferred to you a sum of money, enabling you to open a carpenter shop which you conduct successfully. Who is injured? No one, but society is benefited.

I buy a farm and subdivide it into urban lots because I see the city is becoming congested. May I not be performing a service? Am I a mere speculator? Do I possibly create values and perform a social service?

Let us suppose this case: I buy a lot for you and hold it for a period of years, until you are able to build. Have I rendered you a service? I take a chance and I invest for you. But let us suppose you to be X, any man. Have I rendered a service?

If I buy land and hold it for appropriate use, I perform social service. A lot suitable for a fine downtown office building may otherwise be improved with a very indifferent, inferior building and hinder permanent improvement due to the fact that A, who sold it to me, could not hold for the best social use.

Let us take the case of owners of real estate in a thriving mid-Western city. The taxes, the special assessments mount up, and it is often said that land values must double in ten years to warrant holding the lots. Perhaps this is an understatement. The owners of the land are contributing to the general expenses of the community and the land would not so contribute if it were publicly owned. An addition to a city whether it is made by private or public agencies cannot at once be covered with houses. It is always desirable that there shall be some unoccupied land, and if this is not excessive, those who own and plan and contrive to bring the land into its appropriate use at the right time are rendering a service.

Men build to realize on their urban real estate. It is said that in the city of Milwaukee, Wisconsin, at the present time eighty percent of the home-building is of this kind. Doubtless this is true of Madison, Wisconsin. We have not the statistics available to say how generally this is the case, but certainly a large percentage of all the buildings in American cities will be of this kind. In exceptional periods of rapidly rising values men may often hold the land for

higher bids. Normally and regularly in American cities with their systems of land taxation, based on selling values and with their special assessments and interest on land values mounting up, owners are continually thinking of ways and means of getting a return by bringing land into use or better use. In many places it is scarcely an exaggeration to say that at the present time owners are lying awake nights thinking about ways of getting out their money by the utilization of the land.

Let us take another case. You own a farm in Iowa which I would like to buy. You ask \$600 an acre for it. This is said to be a speculative price and is a price, let us admit, which is not based on any probable income that the land will yield. Is society injured because you refuse to part with the land? Is there any social reason why you should sell to me for less than \$600 an acre? It is hard to see any reason why you should part with the land, unless it can be shown that I can utilize it to better advantage in the interests of society than you are doing. There may be good reasons. It may be you own a very large amount of land, a larger amount than it is considered desirable one person should own, inasmuch as there are social reasons why we should have a large number of independent land owners. If you are a landlord and have a tenant, there may or there may not be reasons of a social nature why you should part with it. On the other hand, you may be making as good a use of it as I or anyone else could make. You may be the owner of a one hundred percent owner-producing tenant farm. In other words, everyone of your tenants may become an owner.

Nor is there any reason why anyone should interfere if I desire to pay \$600 an acre for your farm because it is worth that to me, and I do not know any better use to make of my money, and provided I fully realize that I am paying a high price and am able to do so.

The injury comes in when men are misled. It may be that the misleading is due to a speculative craze, to illusions. It may be that they are misled because they do not appreciate that the price asked is based upon high values of farm products that may not continue, but may be due to inflation of the currency. Harm is done when men buy land with the idea of paying for it out of the results of their toil and are not able to do so because prices are not based upon what the land will yield. If there is a widespread miscalculation, many tenants and small men may toil for years and then lose their all. A great deal of sad wreckage is the consequence. It is a very good thing that federal land banks are holding men down to reality by bas-

ing the loans upon land values calculated with respect to what the land may reasonably be expected to yield.

It may be necessary to regulate price, but that is the last thing that should be done, because it is the most difficult and the most questionable as to the beneficence of its results. It may produce dire evils. We should try all sorts of indirect methods before we touch price. As a matter of fact, the most advanced governments of the world do not regulate price directly, but only indirectly through buying and selling land.

Is land a monopoly? It is spoken of as a natural monopoly, but, as a matter of fact, it is far from being a monopoly. If there were unified control over the land, the land owners could starve the rest of the population to death and could absorb all of the wealth of the world, as John Stuart Mill has pointed out. On account of the limitation of the supply of better grades it has a value and this may sometimes be high. All values, however, imply limitation.

When it comes to dealing in land, a legitimate business may be conducted by a company with large resources. It has happened before this in a case that has come under the writer's notice that several small urban land companies have been consolidated into one large company. Some alarm was expressed at the time, and the question was raised whether the large company was not establishing a monopoly. Subsequent experience, however, has shown that the company was not able to raise prices, which have not gone up so rapidly as before this consolidation took place. Experience has shown that the company has a very limited control and, on the whole, has increased rather than decreased competition. The large company is able to do many things for the community which the smaller companies could not do. They have been able to put up buildings and sell on very small cash payments and, in fact, have made almost any terms that a purchaser could decide upon, provided he had any plausible evidence of being a good risk.

But let us consider some other aspects of the case of the speculator who connects the land with the land user, whether in city or country. If the speculator gets in ahead of the utilizer, and simply appropriates a part of the value that would otherwise go to the utilizer, he is not doing a social service, but a disservice; for it is in general socially better that the values should accrue to the utilizer, *i.e.*, farmer and home owner. There may be an unearned increment in either case, but it is better that it should be widely distributed and connected

with the toil of the farmer or in the city with the one who is homeowner. •

In the settlement of Iowa, it is said that the farmer-settler found the speculator at least just a little ahead of him and had to pay a higher price than would otherwise have been necessary. Thus it took him longer to get on his feet, so to speak, and longer for Iowa to become prosperous and to reach a stage of prosperity like the present. We are not now considering the case of the speculator who asked dishonest prices or who was dishonest in the representation of the quality and other advantages or disadvantages of the land.

The aim of our government in its land policies, especially as seen in its homestead and other laws relating to land utilization of publicly owned land, has been to connect service with the acquisition of land, and to bring the values into the hands of actual users. But owing to imperfect laws and still more to imperfect administrative machinery, it has succeeded in this only very imperfectly.

One other point needs attention. It is said that the case of urban land is different from that of agricultural land; that the speculator may be holding the urban land for a better use, but that this can hardly be the case with agricultural land, for one use does not preclude another. Land may now be used for pasturage and that may not interfere with its subsequent use for wheat or even orchard culture. This is true; and so far as speculation may hold super-marginal land from its best use at a particular time and place, it is injurious. This does not happen to a great extent. Far more injurious is it when the speculator brings the settler to sub-marginal land, as so frequently happens. Here we have a waste of capital, a waste of labor and wrecked lives. This is a great and crying evil and in extreme cases one of the remedies is prison bars.

Let us now consider some current objections to land speculation, to buying and selling land freely. It is connected with high prices for land. But buying and selling in themselves cannot raise prices. It has often been tried in stocks and bonds. If it were possible thus to raise prices, there would be an easy road to a fortune for everyone. Other causes must be back of the higher prices.

1. One of these causes may be a perception of a time situation by those who receive the higher price. Every growing city affords illustration of some gain and often of more loss by those who think they see a demand which will raise price. If price rises, it remains to be seen if the higher price can be maintained. Let us suppose that I think that in one part of the United States with which I am

more or less familiar, I believe land prices are going to increase. If I should invest and realize gain, I would have perceived a situation earlier than many others. Supposing, on the other hand, I believe that in some of our states present prices are unduly inflated and are going to fall. If I am correct in this hypothesis, it may be of advantage to me. The speculation for gain from a fall in prices is not so simple in the case of land, as it is in the case of stocks. But, if, on the other hand, I am in the public service and have to do with land values, or if I am a banker and have to do with credit which affects prices, or if I am an editor of a newspaper, I may in any one of these cases, as well as in other cases, render a service by using my efforts to call attention to the fact of inflated prices and in endeavoring to bring them down to a proper level.

2. The cause of higher prices which lead to buying and selling land freely are at times due to certain psychical conditions. These may become general and illusion widespread. We may have a craze on the order of the tulip craze in Holland and such crazes about stock values as occur from time to time. The result is our land booms which leave sad wreckage. The illusion in regard to developments bringing about increased high prices may be heightened and promoted by the shrewd and cunning, who thus become social enemies.

Let us look at the matter from the standpoint of a well-developed real estate boom, such as took place thirty-odd years ago in Virginia. People got to the point where they thought it only necessary to buy a piece of land and plat it, and that you could build up a city almost anywhere! Of course, in few cases, if any, did those plats ever become cities and the land went back to agricultural uses later. In Madison in 1857 the land to the west of the city including Observatory Hill was platted and then went back to farm uses later. With what kind of phenomena are we dealing here? Well, it is a kind of a craze. People sometimes lose control of their reasoning processes. It is a case of certain psychical phenomena which repeat themselves from time to time. You have here a peculiar manifestation. You have to ask yourself what is the limit? Or, can you prevent this? Is the case different in the case of land from what it is in the case of stocks where you see, perhaps, a greater wreckage?

A little book by Professor E. D. Jones on "Crises" is instructive in this connection. He asks why it is that a boom period, then a crisis, then a period of stagnation, follow each other about once in a generation. He explains it on psychical grounds. People are full of hope of quick gains; their hope and optimism have not been

dampened by experience, so they plunge. They keep buying and selling, then comes a crash because things have been carried beyond reason. That generation has learned the lesson; they will not do the same thing again. Then the next generation learns the lesson by practical experience. You have a new set of men, deluded and carried away by false hopes.

This buying and selling, whether in the case of stock or in the case of land, may develop to a point where it is almost pure gambling, but we cannot stop buying and selling. We have to seek for remedies for illusions in education, in information, and for fraud in an extension of our Blue Sky Laws and adequate publicity and the responsibility of promoters for their statements, but we return to remedies later.

Let us consider some of the other evils, actual or alleged, connected with speculation. Options for land purchase have been condemned as a frequent preliminary phase of speculation. Perhaps giving and taking an option could be called dealing in futures because options look forward to a future which is, as a rule, uncertain as to the values of the land on which the option is taken. But options are simply part and parcel of the free movement, the free sale and purchase of land, and are good or bad, just as the total transaction is good or bad. Let us consider a concrete case. The writer knows a man who took an option on the land that is now a part of a mid-Western city. He paid a dollar for it, and then formed a company. What harm did he do? If he had at heart to less extent the public interest than the owner from whom he took the option, then that was a social injury. But it is quite conceivable that the man who took the option knew more about what was to the public interest than the owner. It may be that the man who took the option made a better use of the land than would or could the man who owned the land. It is probable that was the case and that thus there was with equal probability a social gain. And if he made \$5,000 from the transaction, can it be assumed that the man taking the option did not make as good a use of this gain as would the man who gave the option, had he been able to secure this additional sum for the land?

Now, you buy a lot in the part of the city we are talking about. So far as the purchase of the lot is concerned it is indifferent to you what is the name of the man who owns the land.

Options may be used badly. It is even probable that some special regulation may be required to prevent abuses in land dealings connected with options. But this special aspect of our subject does not require further treatment here and now, as our space is too limited.

Let us take up the question of holding the land out of use. Speculation aims to bring land into use. This must be the result under our American system of taxation and special assessments and it may do so too rapidly, as in the case of forest land and mineral land.

The super-marginal land of the country by and large is used. Exceptions are only a minor matter. O. E. Baker has simply shown this in his work on "The Arable Land of the United States." (Separate from yearbook of the U. S. Department of Agriculture, 1918, No. 771.) In old country in particular land is used.

In the case of urban land, some is taken out of better and put to inferior use, when we have undue extension of cities and unwise platting. But some margin is desirable for emergencies and for future development. As has already been pointed out, the land in an addition to a city cannot all be utilized, for to do so would involve enormous waste. Certain reserves of land are essential to prosperity. Moreover, it is worth while to remember what John Stuart Mill says about land and population. He said he would not want to live in a world in which every land had a full utilitarian use.

Evils and Remedies.—We see that we have to do with good speculation and bad speculation. As to good speculation, to avoid misunderstanding in popular discussion, some other term may be desirable, like investment, or we may use some qualifying phrase, like *speculation in the economic sense*. The evils of speculation are very great, but they are somewhat different from the evils as pictured in the popular imagination. The remedies, on the other hand, are far more complex and difficult. They are largely indirect. Just as capital implies indirect processes, which add to the wealth of society, it is pretty generally the case with remedies for economic evils that in our complex modern society they are indirect and roundabout. Just as those who are working to remedy evils connected with the labor situation find their greatest obstacles in the man with the panacea, so the great hindrance to constructive land policies which provide remedies for remediable evils is the man with his formula. For this closes the mind. We have four great evils. Bad planning, bad distribution of population, unwise selection of land and an inadequate idea of service as connected with property in general and land in particular where the stewardship of wealth needs special emphasis.

But why, it may be asked, should we particularly emphasize the evils connected with bad land speculation? One reason is the immovability of land and the difficulty of rearrangements and readjustments. If a city, like Superior, Wisconsin, is laid out on too large

a scale, involving great waste in the needless expenditures for roads, transportation and public utilities, the remedy is difficult, and it may take generations to bring about a readjustment. Vacant lots cannot be shipped from places where not needed to places needed as we can ship commodities. But there is a special reason why we need safeguards for evils connected with speculation in land, because of the number of users of land and because it is a kind of an investment that appeals to the economically weaker elements in the community—the teacher, the carpenter or other mechanic, the preacher. Land is connected with homes, and it is desirable in every way that it should be so handled as to increase home ownership. *Laissez-faire*, it is found, does not work. It has always broken down and is now breaking down in every old and well settled community. Government regulation is necessary. We have had more or less of it in this country, but we need more. Land Commissions, both for city and country, are needed to help the settler or the user of land to get on the land in the right way and under right conditions. To prevent waste, we need planning, and what is called in New Zealand closer settlement to avoid the waste of scattered settlement which always results from *laissez-faire*. For cities and countries both we need planning, and plans should receive the approval of competent boards.

We can well raise the question as to public or private ownership of land for the extension of cities. Savannah in Georgia and Ulm in Germany furnish us illustration of purchases of land by cities themselves for urban extensions. Much can be said in favor of public action in cases of this kind, and the question will largely be decided in specific cases by the character of the city government which actually exists or is to be hoped for. Here as elsewhere, the great problem of the twentieth century is one of administration far more than it is one of legislation.

In any case we cannot dispense with private ownership and private effort. In a state like Wisconsin we find many land companies of long experience and of good purpose. Thousands of men are doing what they can to bring the land into its best utilization. The great function of land commissions must be regulation and encouragement of private effort. Nevertheless, the world experience seems to show that to a greater or lesser extent all governments must be in the land business, buying and selling land in the general interest. The government must look upon itself as a trustee of the land for society.

There is a great deal of land which is sub-marginal and for which public ownership is desirable. Land must be purchased also in order

to bring about orderly plans of development. We consider all of this elsewhere in our discussion of land policies.

We have remedies for all evils in voluntary purchase, in condemnation, in the police power and in the distribution of the burdens involved in changes through taxation. Always our aim must be PROGRESS WITHOUT CONFISCATION, always our aim must be above all to anticipate evils.

Finally it should be remembered that all collective action is not governmental action. Private organizations are already doing a great deal to bring about proper land utilization and prevent the evils of bad speculation. Where government is unable or reluctant to do its part in the land business, there is all the more need for private effort. Chambers of commerce are realizing their opportunities more and more, and bankers are looking upon the man who wants to buy a home either in the country or city in a new light. The City and Suburban Homes Company, of New York City, gives an illustration of one kind of service which can be wisely and widely extended. Land is bought and improvements made on it, the effort being to give the best possible in the way of tenements and other homes consistent with a very modest return on investment.

We need not continue our illustrations. Every sound land policy helps to remedy the real evils connected with land speculation and to strengthen the arguments for land as a sound and conservative investment.

STUDIES OF LAND VALUES IN IOWA.

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During the past year it is probable that the average Iowa farm has advanced approximately \$16,000. This added capitalization at 5 percent is \$800, the additional sum a farmer must receive from now on to get pay for his labor.

The purpose of this paper is to offer some of the reasons for Iowa farm land selling at its present prices. Most of the data were obtained from farm management surveys, farm business records and questionnaires sent to farmers, other business men, and county agents. The two methods followed are first, to collect the facts and interpret them according to approved methods and second to obtain the opinions direct and compare the results.

A study of land values includes prices of land, terms of purchase, prices of farm products, and a study of the profits of farming, etc.

A. THE PRICE OF LAND AND TERMS OF PURCHASE.

I. *Advance in the Price of Land.*—Table I shows the advance in the price of Iowa farm land from 1850 to March 1, 1920.

TABLE I.

Year.	Price per Acre.	Advance per Acre.	Percentage Increase.
1850 ¹	\$ 6.09	\$
1860.....	11.91	5.82	95.6
1870.....	20.21	8.30	69.7
1880.....	22.92	2.71	13.4
1890.....	28.13	5.21	22.7
1900.....	43.31	15.18	54.0
1910.....	96.00	52.69	121.7
1920 ²	255.00	159.00	165.6

These data are taken from the census except for March 1, 1920. This figure is taken from reports from the Bureau of Crop Estimates.

¹ Federal Census.

² Bureau of Crop Estimates.

B. TERMS OF PURCHASE.

Table II shows the price per acre, total value and payments on farms for the years 1917 and 1919.

TABLE II.

Year.	Price per Acre.	Total Value.	Percentage.			
			Paid Down on Contract.	March 1st.	First Mortgage.	Second Mortgage.
1917.....	\$211	\$31,778	3.2	32.0	41.0	23.8
1919 (Apr., May, June)	303	43,469	3.2	31.9	31.8	33.1
1919 (July, Aug., Sept.)	373	50,742	3.1	31.7	42.9	22.3

These data came from one of the most fertile spots in Iowa and are typical of farm sales. It should be noted that the percent paid down on contract and on March 1 were as large during the summer of 1919 as in the previous periods.

Table III gives the time and rate of interest for the years 1917 and 1919.

TABLE III.

Year.	First Mortgage.		Second, Third and Fourth Mortgage.	
	Years.	Rate.	Years.	Rate.
1917.....	7.6	5.2	8.1	5.1
1919 (Apr., May, June).....	6.5	5.1	8.5	5.3
1919 (July, Aug., Sept.).....	10.5	5.3	6.4	5.6

The time and rate of interest given when farms were exchanging most rapidly were no better than in previous periods. Both tables show that terms of purchase were not one of the principal causes for the advance in the price of land. While these terms of purchase were easy and no doubt promoted the sale of land, they were not more easy than those given early in the year and in 1917.

C. EARNING POWER OF LAND.

I. *Correlation of the Prices of Farm Products and Farm Land.*—

Table IV shows a correlation of an index number of crops and live-stock prices with an index number of the price of Iowa land.

TABLE IV.

(100 = average 5 years 1910-1914.)

Year. (Aug. 15th).	U. S. Prices of Crops and Livestock	Price of Iowa Farm Land.
1919	234.3	239.3
1918	214.1	137.0
1917	178.3	124.5
1916	121.2	120.1
1915	101.5	115.7

In 1915 and in August 15, 1919, the land price index exceeded the U. S. prices of crops and livestock. In those years land had been capitalized at more than the prices of farm products current at the time.

Table V shows the labor income and landlord's percent on investment on Iowa farms.

TABLE V.

Year.	Labor Income.	Landlord's Percent. on Investment.
1918	\$2,656	4.07
1917	3,285	4.34
1916	1,659	3.12
1915	370	3.95
1913	303	2.48

The data for 1913 and 1915 are taken from surveys of 965 and 832 farms respectively. About fifty farms were selected from the two surveys and these furnish the data for the years 1916, 1917, and 1918. The selected farms are better organized and more efficiently managed than the average farm.

D. PURCHASING POWER OF FARM OWNERS.

Table VI shows the net worth of 204 farmers who reported in 1914.

TABLE VI.

Years Owner.	Age of Operator..	Net Worth.
3	38	21,170
7	43	29,121
12	46	38,631
25	55	50,679

In recent years farmers have accumulated net worth more rapidly. This is largely explained by the more rapid advance in the price of land in recent years. In 1916 a survey of 345 owner farmers in

southern Iowa showed an average net worth of about \$20,000 at the age of 49. Representative data from different parts of Iowa for March 1, 1919, gave an average net worth of about \$39,000 at 46 years of age. It is safe to assume that the average owner operator had a net worth of approximately \$40,000 as a basis for buying land during the past summer. Without drawing on this principal he had an available annual income of about \$3,000 to pay living expenses, and buy land.

The data presented indicate one of two things. First that buyers of land were thinking in terms of the prices of farm products current at the time. Second, that regardless of land paying its way they could afford to pay the price for other reasons.

E. RESULTS OF QUESTIONNAIRE.

I. A questionnaire was sent to every county agent in Iowa. About half of them reported the conditions in their counties. They reported that about 40 percent of the farm purchases during the summer were purely speculative, leaving 60 percent for farming purposes.

The five principal causes for the advance in the price of land are:

1. Speculation.
2. Prices of food products.
3. Returns high compared with other places.
4. Home.
5. Never lost on investment.

Two thirds reported that the price was justified and 80 percent reported that land is as high now as August 15, but is quiet.

II. The county agent was requested also to hand a questionnaire to an experienced farmer who had bought land during the summer. These farmers had a net worth of over \$34,000 at 41 years of age. This past summer they paid \$275 per acre for land and bought farms which averaged 242 acres.

These are the six principal reasons they gave for buying land at that price:

1. Close to town, school, church, market, a home.
2. Land will pay a fair rate of interest.
3. Fertile farm.
4. Good investment.
5. Needed more land to keep boys on farm.
6. Speculation.

It should be noted that a farm owner is a bull on the market.

Whether his land is for sale or not he is generally optimistic that the price will maintain or go higher. The county agents put speculation as the first cause for the advance in the price of land, the farmers placed five other causes as more important.

F. INTERVIEWS WITH BANKERS AND FARMERS.

Generally speaking bankers and farmers were optimistic that the price of land would be maintained or would advance. They believed that present prices for farm products will continue for a few years. They thought it unwise, however, for a man to buy a farm at present prices unless he had approximately one third or more of the purchase price.

The following interview is typical of 5 percent of Iowa's most successful farmers. This man is 41 years of age. Although according to his own statement he has never inherited wealth, last March he was worth \$100,000 and he estimates 75 percent of it has been made in farming. He had only a common school education, rented 11 years and has owned land 6 years.

"If one-fourth the present prices of farm products were taken off, this land produces enough to be worth \$400 per acre. This land is only producing one half of what it is capable of producing. Last year I sold 26 carloads of lambs, hogs and cattle from a 240-acre farm by buying only 2,300 bushels of corn. Fifteen carloads were lambs but they increased 23 lbs. per head. The farm has produced \$75 per acre per year the past three years. One field that has been corned for six consecutive years is producing an 80-bushel corn crop this year. Rape has been sown in the corn every year and lambs and hogs have harvested the crops."

"At least 75 percent of the buyers here this summer have been farmers who bought to keep the farm. Three years ago 160 acres of this 240-acre farm was bought at \$300 per acre, a big price at that time. I was jeered by friends for paying too much for the land. This summer this 160 was sold for \$600 per acre or \$96,000 with a cash payment of \$25,000 and fair terms on the balance. I was jeered again for taking advantage of the party to whom I sold the farm. To quiet those who jeered me, I offered \$1,000 to any one present if the farm could be bought at \$700 per acre. The farm has not been resold. I offered the wager of \$5,000 that farm land in this county within ten years will sell for \$1,000 per acre."

SOME SALIENT FEATURES IN FARM ORGANIZATION.¹

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In our discussion of some of the salient features in farm organization we should, no doubt, find it profitable to make a careful examination of the question, from the standpoint of both the financial and physical organization of the farm. Both of these phases of farm organization are of primary importance, and no study of the question would be complete without paying considerable attention to the problems involved under these two heads. Because of the limited time at my disposal, however, and because of the fact that these phases of the problem are perhaps better understood than others which I hope to discuss more in detail I shall only touch upon a few of the most important considerations in the financial and physical organization of a farming business.

In the financial organization of a farm we are concerned mainly with the size of the business which is best adapted to the particular type of farming under consideration, and with the most advantageous distribution of the investment in the various items of farm property.

While we have not as yet determined with any high degree of accuracy the *best* size of business for the principal types of farming, we have determined within reasonably narrow limits the *minimum* size which is fairly well adapted to the successful operation of farms carrying on the principal types of farming in the different type areas. Thus we find that in nearly all of the areas studied the minimum size of farm which seems to be well adapted to the prevailing type of farming is one which is large enough to provide full employment for approximately two men. In the middle west, insofar as is shown by the data available, this means that the minimum size for successful farms ranges from 80 to 100 acres of crop for dairy farms; from 120 to 140 acres of crop for mixed farms on which the major part of the crops grown is fed to meat-producing animals; and from 150 to 180 acres of crop for grain farms on which most of the crops grown are sold directly. Naturally the *acreage of crops raised*, will be a better

¹ Paper read before the tenth annual meeting of the American Farm Economic Association, November 11, 1919, Chicago, Ill.

measure of the size of farm than the *total* acres, since any areas in timber or permanent pasture usually require only negligible amounts of labor. It is, of course, true that the size of farm may sometimes be measured in terms of capital invested, or on the basis of the amount of labor used, but in general farming the *acres of crop* grown is perhaps the most satisfactory single measure of the size of farms.

Insofar as the investigations made to date throw any light upon the question of the *most profitable* size farm, it would seem that the most successful farms in the middle west are those which are 50 percent or more above the average in size, *i.e.*, farms which have a large enough business to provide employment for three or more instead of the minimum of two men.

In the study of the most advantageous distribution of the investment in the various items of farm property, we must naturally take into consideration the question of the amount of capital available to the operator. This will decide in a large measure whether he will own his own farm or rent land from another, using his capital to invest in horses, machinery, livestock, and other items of personal property. The man with limited capital and a fair amount of managing ability will unusually do better to rent a part or all of his land in order to have a business large enough to offer opportunity for the full utilization of his management skill. It is generally better for the capable farmer to be a tenant on a farm large enough, than to own a small farm on which he would be handicapped by lack of land or capital in carrying on the business in the most effective manner.

The investment in farm buildings, machinery and work animals necessary to satisfactorily meet the shelter requirements and to perform the farm work in an efficient and economical manner have been fairly well worked out for nearly all of the principal types of farming in the older agricultural regions.

The investment in the various classes of livestock and the amount to be invested in fertilizing materials to replace the plant food removed from the farm in the system of production employed will be considered in the discussion of the production of the crop and animal enterprises.

Before taking up in detail the discussion of the productive organization of the farm, I wish only to point out in passing that the question of the physical organization of the farm as a whole as well as the organization of the farmstead and the farm buildings, presents many problems of primary importance. The proper organization of the field system is necessary to best meet the needs of the cropping sys-

tem planned; to economize on fencing and man and horse labor used in performing the field work; to save time in getting from the farmstead to the fields; and to reduce the length of haul in moving fertilizer from the farmstead to the fields and in transferring crop materials from the fields to the farmstead.

The planning of the physical organization of the farmstead, the farm buildings, and the general layout of the farm plant deserves the most careful consideration. This is of special importance from the standpoint of sanitation and comfort, both for the farm family as well as the farm animals, and from the standpoint of convenience in the care and feeding of the livestock carried.

In studying the productive organization of the farm, to which I wish to devote the major portion of my paper, we must appreciate at once that we are dealing with a number of highly complex and interrelated factors all of which have a bearing on the final results of the business. The productive organization of the farm deals with such important problems as the selection of the crops which are to be included in the cropping system and the determining of the proportions in which the various crops selected are to be grown. This problem must be worked out on the basis of the influence of the cropping system on soil maintenance; the relative profitableness of the various crops included in the rotation; the most advantageous utilization of man and horse labor required in growing such crops; the providing of insurance against crop failure and market fluctuations, by including in the rotation crops having different seasonal and climatic requirements; and the adaptation of the crops grown to the livestock which is to be included in the system of production planned.

If the system of farming planned is to include the production of one or more classes of livestock, as it must of necessity in a very large proportion of all farms, we must again decide as to the kind or class of animals which is to be carried, the total amount of all livestock, and the proportion of each class of animals selected. This problem must be worked out mainly on the basis of the feed crop produced under the cropping system adopted; the proportion of the farm which must necessarily remain in woodland and permanent pasture; the marketing factors including the distance to markets, wagon roads, railroad and other means of transportation, and the demand for the different livestock products at the markets available; also upon the character and supply of labor available in the region under consideration.

It is obvious that in attempting to work out all of these problems.

giving due consideration to all of the factors involved, and finally deciding upon the course of procedure to be followed after all of the factors have been carefully considered, that the farmer must have a large background of experience and he must have at his command all of the information bearing on the question if he is to be even reasonably well equipped to plan the productive organization of his farm in such a way as to contribute most to its profit and general success.

Because of the fact that farm organization has been developed so largely on the basis of empirical information, and because we have only recently begun to pay serious attention to the problem of making definite plans for the scientific organization and operation of our farms, it has been somewhat generally assumed that it was not only impracticable but impossible to make any systematic plans for the organization and operation of a farming business. While it is no doubt true that we do not have as yet all of the facts necessary to work out such a problem on a definite engineering basis; we do have, if we will but collect and organize the available information, a very good basis for making a good beginning in working out definite plans for the organization of our farms in practically all of the important farming regions where agriculture has been carried on for a reasonable length of time.

In order to point out somewhat specifically what seem to me to be the essential facts which need to be taken into consideration in planning the organization of a farm and to illustrate how such facts can be used, I wish to discuss somewhat the whole question of making a definite plan for the organization of a farm in any given region, and to what extent the practical farmer shall probably be justified in making such plans.

In discussing the planning of a system of farming, the first question which naturally arises, is, can we plan a system of farming with any measure of assurance that the general results anticipated can be realized even approximately?

Before attempting to answer this question, let us examine somewhat the nature and essential characteristics of types and systems of farming. In doing this let us inquire first into what constitutes a type of farming. We have in each important agricultural region, where agricultural practices have become somewhat thoroughly established, a certain general scheme of production which is typical of a considerable proportion of all farms in that region. These farms follow the same general plan of crop and animal production. They

are more or less uniform in size, soil type, topography, buildings, equipment, labor requirements and other essential characteristics of a farm business. These groups of farms we ordinarily designate as types.

These farming types represent the best adjustment which those identified with their development have been able to work out with their present knowledge and ability to cope with the conditions as they actually obtained. They represent a great deal of experience, and a considerable amount of skill in keeping the farming of the region adjusted to the constantly changing economic conditions. It is not to be assumed, however, that these types, necessarily including a large number of farms, represent absolutely the best adjustment that can be made at any given moment. In fact, since the conditions of production, such as price of land, supply and price of labor, cost of buildings and machinery, cost of fertilizers, and a variety of other factors, are continually changing, to say nothing of the changes in demand for different farm products and the resultant difference in their relative profitableness, we may assume that these types which naturally change rather slowly as a general rule are not always, if ever, in the most profitable adjustment. In fact, every advance in methods of production and marketing tends to make obsolete to some extent the present plans. Naturally some farmers will be more acute to the changes required, and will make their plans as adaptable as possible in order to take advantage to the fullest extent of such desirable changes. These will naturally increase their profits over others in proportion as they can keep their business better adapted to the changing conditions.

Entirely aside, however, from the matter of keeping the farm business adjusted to the times, is the question of developing the general efficiency of the business in producing the crops and animals which may be somewhat typical of the region. That is, a farm may be fairly typical of the region in that it produces the same crops and in the same general proportions, and feeds them to the same general classes of livestock. It may be getting considerably better results, however, because it produces larger crops or makes a larger return for these crops when they are fed to livestock. Or if it does not secure larger returns in terms of crops or animals it may be producing equally good returns with a smaller expenditure for man labor, horse labor, machinery use, or other items of expense in operation. That is, the type of farming may be the same, but the system of production may be very much more efficient.

Naturally these differences in the systems of production employed may also include to a greater or less extent important differences in the kind and proportions of crops grown or in the class and proportion of livestock produced. For example, they may include in the rotation a greater amount of legume crops than is common to the region. This in itself represents one of the fundamental differences in systems of farming. It may determine for all practical purposes whether the system is extractive or whether it attempts to maintain the soil. That is, while the growing of legumes in large enough acreage to maintain the nitrogen does not of itself insure the maintenance of the soil, it represents in many sections the initial and often the most difficult step in the introduction of a permanent system. The mineral fertilizers, particularly phosphorus and limestone where these are needed, can usually be purchased in inexpensive form and applied at relatively small cost.

The growing of legumes in greater proportion than is commonly grown in the region, or the production of crops in different proportions might constitute the first step in differentiating the system of production employed from that used on the most typical farms. Whether such variations from the typical are justified from the standpoint of profits is a matter which must be based on a careful analysis of existing conditions. Unless they are better adapted to the conditions obtaining than the usual plan they will not tend to increase the profits of the business.

We might say, then, that any plan of production which is to produce results better than those obtained from the typical farms of the region, must do so either by carrying on the usual type of farming with unusual efficiency, or by deviating from the usual types of production in such ways as will result in increasing the profits in the business. That is, we might say that such systems must employ unusual skill either in following the usual practice, or in anticipating the changes which are justified but which have not as yet come into common practice. On this basis we might define a system of farming as a carefully worked out plan of conducting a farm business in which some systematic effort has been made to employ scientific methods of organization and operation.

The question as to whether we can plan a system of farming with any reasonable assurance that it can be carried out successfully, is one which must rest largely on experience. That is, the question as to whether it can be done, must be answered before long by the facts as to whether anyone is really doing it.

On the basis of considerable observation of actual farmers attempting to carry out somewhat carefully planned systems of farming, and on the basis of general accounting and cost accounting studies made in Illinois and elsewhere, it is not too early to say that significant progress has already been made in planning systems of farming, and in executing the plans made. Naturally we can hardly expect as yet to reduce such plans to a definite engineering basis, although we have already made important advances in determining the best adaptation of different crops, the plant food requirements of crop production, the feed requirements of different classes of animals, the labor requirements of different crop and animal enterprises, and a variety of other factors which will be of great importance in working out much more definite systems of production.

While it is frequently pointed out that farmers cannot control the weather and other factors of almost as great importance, it must be kept in mind that the weather also affects other industries. These are often quite as much at the mercy of the weather as is the farmer. A carefully planned system of production may not eliminate adverse seasonal conditions, but it usually goes a long ways towards modifying the results of such adverse seasons. It may not be able to guarantee maximum yields, in a bad season, but it should go a long ways toward insuring against a total crop failure, and in making the most profitable use of the crops produced, even though yields may be considerably below the normal. A good system of farming is not a "fool proof" guarantee of profits, but a reasonable insurance against loss in an unfavorable year. From this standpoint it deserves the most careful study on the part of the farmers of every agricultural region with a view to working out the best systems for each particular region.

As we get more accurate information regarding the essential facts in our most important agricultural regions we shall have a continually better basis for planning such systems of farming. As we work out and learn to understand more fully the principles underlying various systems of farming and determine the basic factors for certain standard operations we shall have an increasingly better foundation for reducing our systems to a scientific basis. It is interesting to note that the same problems were met with much skepticism and even ridicule in engineering circles 15 or 20 years ago.

In planning a system of farming for any given region we must first take as accurate as possible an inventory of the types of farming already being carried on. We must attempt to analyze as well as we

can the basis for deviating from the standard practices or types of the region. That is, we must decide to what extent we may deviate profitably from it. Naturally any important deviations must be made only on the basis of the best possible reasons. We must assume that the present practice had at some time a good reason for existing. The only basis for varying from it would assume that changing conditions justify such changes in the system of production.

One of the first and most important problems to be decided is that of working out a system of production that is designed to maintain the productive capacity of the land itself. It is evident to all students of this problem that the agriculture of every new region must almost of necessity be extractive. This is true because farming has in general been carried on on a very narrow margin of profit, and because those who would have made provision for maintaining their soils had to produce in competition with those who paid no attention to the matter. Since land was cheap and the supply usually almost unlimited, each man could make the largest return by farming a large area, *i.e.*, farming extensively and farming extractively.

The natural fertility of the land and the cropping system practiced determined to a large extent how long such lands could be farmed before the yields declined sufficiently to justify any change in the systems of production. Sometimes a simple expedient was found by merely selling or abandoning the land and moving on to other virgin areas in a new region. It must not be assumed, however, that declining yields are the best basis for deciding when to change from an extractive to a more permanent system of farming. This may be economically justified long before there is any evidence of declining yields. This is especially true on the most fertile soils.

Before such lands actually decline in yields, the price of the land has usually advanced far beyond the original cost. This factor alone may be the basis for deciding upon a more permanent system of production. Under these new conditions, it is usually necessary to make a much larger return per acre if a satisfactory rate of interest is to be made on the investment. In the corn belt for example, due to the unusual fertility of our soils, we have farmed extractively perhaps as long as in any important agricultural region. A great mass of experimental data on the detailed study of soils and crop yields, as well as accounting studies on actual farms, indicate that a more permanent system of farming in this region has been justified economically for some time past. That is, the unit costs of production for the standard farm crops is less under a good system which approximates per-

manency, than where an extractive system is practiced. In spite of this fact, the general types of farming carried on are still almost entirely extractive.

Entirely aside from the important question of national policy and public welfare involved in the conservation of our soil resources is the question of sound business practice from the standpoint of the individual farmer. If farming is to be considered as a continuous-going business instead of a speculative or real estate enterprise, conservative accounting practice demands that the farmer take into account the depreciation of his chief asset, the land, or that such replacements as are necessary to maintain the land be included as a part of his costs of production. This must be done even though the land itself may be advancing in price, in spite of the fact that it is generally declining in productive capacity. It is of first importance that farmers generally establish permanent systems of production, or at least go as far in that direction as the economic conditions warrant. From all of the data available it is plain that for practically all of our older agricultural regions, such systems are not only imperative from the standpoint of national policy, but more profitable from the standpoint of the individual operator.

In planning the system of crop and animal production for an individual farm the following outline giving the detailed steps in the process and the order in which they would perhaps logically be taken up may serve as a general guide in establishing principles of procedure.

If the farm under consideration is typical of the region as to size, proportion of land improved, soil type, and other general factors we may assume the system of farming planned had best follow the general practice of the region. This is especially true while the plan is getting into operation, leaving any marked variations to be worked out somewhat gradually on the basis of experience as shown not only by general observations but also by carefully kept records and accounts of the results of the business.

Insofar as the factors of soil and topography are typical of the region they will decide quite definitely the kind of crops which must be grown in any area where the agriculture is fairly well established. I wish to emphasize this point particularly. We are prone to speak of the choice of enterprises with reference to crops as well as livestock as though the farmers of every region had a wide range of choice and that the problem of selecting a few crops from a list embracing a considerable number was one of the important decisions which the farmer has to make in organizing his system of production.

As a matter of fact this is not true to any great extent in any important agricultural region with which I am familiar. The natural factors such as climate, soil, and topography determine within very narrow limits what crops can be grown economically in a region. In most areas this list is confined to not over three or four non-legume crops. The list of legumes is scarcely as large, embracing usually not more than two or three. In any event the relative profitableness of the various crops which can be grown in a region differs to such an extent as to narrow the choice down to a very few crops, even when we take into consideration the most advantageous distribution of labor and the factor of insurance made possible by a reasonable diversity of crop production.

If we examine a few of the most important farming areas with reference to this point we note that very few of them are growing more than two or three non-legumes as major crops. Most of these areas are growing not more than one or two legumes. In the Northwest for example, spring wheat is the principal crop. Barley and oats are the other two important non-legumes. Legume crops are grown only in a limited way in most of this area, with red clover exceeding by far all other legumes combined. In the corn belt, corn is the principal crop. Oats, and fall wheat in some sections, make up a very large part of the non-legume area in addition to corn. Red clover is by far the most important legume crop, although alfalfa, other clovers, and soy-beans make up an appreciable proportion of the legume acreage. In the South, cotton is the chief crop. Corn, a direct competitor of cotton, and oats are the most important other non-legume crops. The cow pea and crimson clover are the more important legume crops grown. In New England, timothy hay, oats and potatoes are the most important non-legume crops. Red clover and alfalfa are the principal legumes grown.

In nearly every one of these areas there is one outstandingly important non-legume crop from the standpoint of profitableness. Because of this factor it has been the common practice of nearly every one of these regions to grow the one most profitable crop more or less to the exclusion of all others, especially in the beginning when the farming was almost entirely extractive. Thus the Northwest grew spring wheat, the corn belt grew corn, and the South grew cotton more or less to the exclusion of other crops on the land well adapted to the most profitable crop in the respective regions.

In the process of changing the system of crop production so as to more nearly meet the requirements of a good rotation, the question

of the proportions of the various crops to be included in the rotation is of first importance. Since corn is the most profitable crop in the corn belt section, it is evident that we should still continue to grow as much of this crop as is consistent with the maintenance of soil fertility, the advantageous distribution of man and horse labor, and crop insurance as provided by a reasonable amount of diversification. In actual practice it means that a good system of farming must include from 20 to 25 percent of the crop area in some legume crop each year. The proportion of legume acreage required will depend on the yield of the legumes grown, the nature of the other crops included in the rotation; the disposition made of the crops grown, either through livestock or direct sale, and the care with which the barnyard manures are handled and applied to the land.

All available data indicate that in the corn belt section corn should be grown on from 40 to 50 percent of the rotation area. When it is grown to a greater extent than this it becomes impracticable to maintain the soil fertility, the distribution of labor is very unsatisfactory, and insects and other pests cannot be so well controlled. If, therefore, we have from 40 to 50 percent of the rotation in corn, and 20 to 25 percent in legumes, we have remaining from 25 to 40 of the rotation area to grow other crops. Under corn belt conditions this usually means that the balance of the rotation should be made up of oats or a combination of wheat and oats in equal proportions where these two crops are about equally well adapted. Thus we would have the following as somewhat standard rotations for the corn belt sections of Illinois: (1) corn, corn, oats and legumes, or (2) corn, corn, oats, wheat and legumes.

Naturally these crops and the proportions will be varied with variations in the soils, topography, and climatic conditions. In the winter wheat- and rye-growing section of Illinois the rotation would include about the same proportion of wheat or rye as it does of corn in the corn belt section, the proportion of legumes would be in the main somewhat larger because of the poorer soils, leaving the balance of the rotation area to be devoted to next best crops which in this case might be corn, although corn is not particularly well adapted to most of the wheat-growing areas.

On the basis of all information available either from agronomic or farm management investigations as well as the experience of practical farmers, there seems to be after all little choice as to the range of crops which must be grown. The proportions of each crop, or the

best combination of crops to be grown in the rotation seem to be also fairly well established for most of the important farming areas.

Once the general plan of the rotation is decided upon, a fairly good estimate of the average crop yields which should be produced under the system adopted can be made. Naturally there will be wide fluctuations in such crop yields, but the basis for estimating what they will be on the average is quite as definite as is the basis for making similar estimates for production in many other lines of industry.

On the basis of the number of crop acres and the nature of the rotation we can determine with considerable accuracy the number of work horses required to satisfactorily perform the work. The number of crop acres and the kind of crops grown will also furnish the basis for estimating quite accurately the machinery and tools required to operate the farm. By calculating the feed required by the work horses to be carried we can determine, by subtraction from the total feed produced, the amount of feed that will remain to be sold directly or converted into livestock and livestock products.

On the basis of this estimate of the amount of feed to be used for productive livestock, we must calculate as best we can how much livestock to plan for. Naturally the proportions and character of roughage and grains will determine to some extent the classes of stock we can best produce. If we have relatively more roughage and less grains we must plan on a larger proportion of cattle or sheep. If the section is a dairy section, dairy cows will naturally furnish a good market for the rough feeds in combination with some grain. In deciding this question the labor supply and the market for dairy products must naturally be taken into consideration.

If meat production is to be the chief business, we must decide whether we will grow our own beef calves or lambs, or whether we will buy all or a part of the feeder cattle or sheep. Naturally the quality and finish to be put on the cattle will determine to some extent the proportion of roughage to grains needed. The better quality the cattle or sheep the more finish it will likely pay to put on them. The more finish desired the larger proportion of grain to rough feed will be required. Cheaper cattle, carried to a lower finish can use relatively larger proportions of roughage, such as silage and legume hay. Beef-breeding cows and breeding ewes can also use relatively large amounts of rough feeds. Naturally the supply of feeder animals, and the proportion of roughage and grain on hand must decide in a large measure the feeding system to be followed.

A certain balance must also be planned for between pork produc-

tion and beef or mutton production. While we are learning to market relatively more rough feed, in the shape of green legumes, through hogs, the hog is after all mainly a means of marketing grain and concentrates, especially corn.

In working out the relative proportion of each class of productive livestock, we should make an attempt to determine the general ratios between grain and roughage for swine, beef cattle, and sheep according to the system planned, and from these ratios, and the feed on hand, work out as accurately as possible the proportions of each class of animals that can be fed.

In sections which normally produce a considerable surplus of feed, less attention need be paid to adjusting the animals carried, to the feed supply on the individual farm since feed can usually be purchased at a reasonable price. In sections which normally import feed the number of animals planned for should leave a margin of feed on hand, since in these sections especially when feed is scarce the price is usually too high to net much profit in feeding livestock. In general it is safer to plan on buying some feeding stock than to plan on buying feed. If feed is short none need be bought, if it is plentiful more stock can be purchased.

The feed requirements for producing the different kinds and amounts of meat products can be estimated in detail with a considerable degree of accuracy on the basis of the standard rations and the standard gains for each class and kind of meat animal. Thus we know that a certain amount of corn silage and legume hay should make a certain number of pounds of beef or mutton. Or a certain number of pounds of corn and tankage or a certain number of acres of legume forage will produce a certain number of pounds of pork.

The amount of feed produced, the number of horses carried, the machinery needed, and the kind and proportion of productive livestock will furnish the basis for planning with reasonable accuracy the building space required for storage, shelter and other purposes.

On the basis of the number of acres in the farm, the number of crop acres, and the amount and kind of livestock kept we can determine the number of men required to perform the labor necessary in carrying on the system of production as planned.

Thus we can work out on the basis of a considerable amount of accurate information available the most advantageous combination of crops to grow, *i.e.*, a good rotation for the region. We can calculate fairly accurately what should be the yields under good farming conditions. From the feed requirements of work horses and productive

livestock we can determine fairly closely how much animal product of a given kind and quality can be produced under the system as planned. We can also determine quite accurately the buildings and machinery equipment needed and the man labor requirements of the system of farming as planned. That is, we can plan in advance with a considerable degree of accuracy the investments in the various classes of farm property, the amounts of crop material and animal product which the system will provide, and the general operating expenses, as well as the fixed charges of the business.

Naturally the results of any such system in terms of cash return cannot be guaranteed in advance. It seems logical to assume, however, that by carefully planning such a system we shall come much nearer realizing the results aimed at and more nearly insure a profit in the business. In fact definite progress has already been made by a considerable number of actual farmers in establishing carefully worked out plans of farm organization based on the general method of procedure outlined.

In spite of the fact that we already have in several of our most important farming regions a better basis for making plans for the somewhat scientific organizations of our farms than is commonly recognized, much remains still to be done. A great amount of carefully conducted investigational work needs still to be done to make possible really scientific procedure in the organization of our farms, if agriculture is to keep pace with the development of organization in other industries.

PROBLEMS OF THE FARM MANAGER.

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Thousands of men and women are ambitious with the desire to own a farm of their own and thereon build a home and a profitable business. In the days of homesteading and cheap land this desire could be realized with very little capital provided one wished to cope with the hardships and difficulties of frontier life. At present practically all the available government land has been homesteaded, the frontier has disappeared and practically all the available agricultural land is held in private ownership and is increasing in value from the most remote areas of production or from the least productive land to the centers of population and the most highly productive land associated with the best social advantages.

A normal increase in land values should not alarm the prospective land owner because such increase is normally based on the added improvements to the farm and upon the public and private expenditures for transportation, for telephones, for schools, for churches, and for such other private and public improvements and utilities as will make it possible to maintain a reasonable return per dollar invested coupled with increasingly better social conditions.

The increased land values however have created at least one outstanding problem for the one who intends to become a farm owner and that is the necessity of accumulating a sufficient amount of capital to meet the required initial payment on the land and to provide the necessary working capital for the operation of the farm. In negotiating a land deal it has been quite customary between the seller and the buyer to come to certain so called terms with regard to the amount of the first payment and subsequent payments and interest rates on the indebtedness with the usual result that the buyer sinks from 80 percent to 90 percent of his capital in the land and leaves from 10 percent to 20 percent for working capital and improvements and is consequently handicapped in the operation of his farm and must trust to luck in making his subsequent payments, which amounts are stipulated in the contract with the provision that if not paid such contract shall be null and void, time being the essence of the agreement, etc.

This is a good beginning of a nightmare, for the buyer, which may last for several years or may end abruptly as the case may be, and to make the realization of this nightmare as vivid as possible, the stipulated annual payments are often much larger than the farm can reasonably be expected to return above the family cost of living, interest on the investment, and the cost of operation.

This condition offers a field for study in farm economics which should lead to certain standardizations for farm finance applicable to the different agricultural regions of the United States. This leads up to the problem which the M. Sigbert Awes Company, in its business of land settlement in North Dakota, is attempting to solve and which has created for the company problems in farm economics and farm management.

This company sells its land under what is known as a Crop Stock and Insurance Contract. Under this contract the buyer makes a small initial payment of about 20 percent of the purchase price of the farm and he is allowed ten years in which to complete the remaining payments by each year turning over to the company one half of the proceeds from the sale of crops and livestock and livestock products which is applied, first, in payment of the interest, and, second, in reduction of the principal until paid. The insurance feature provides that the buyer must insure his life to the company as beneficiary during the period of the contract for an amount equal to his indebtedness, which means that in the event of death the debts on the farm will be satisfied in full and the family will inherit the farm clear of all incumbrances.

The success of a project of this kind from a business standpoint depends entirely on whether the farmers who have bought land under this contract will make good and the more rapidly they will make good the greater the success of the business.

We therefore recognize that this business venture aside from its economic aspects is a problem in farm management and that the success of it is very largely contingent upon a knowledge and administration of sound principles of farm management applied to every farm from the time that the new owner takes possession until the farm is paid for, and it is therefore essential and important that the new owner receive the proper advice with regard to the best methods of farming and farm management and that proper direction be given in the organization of each farm into an efficient business unit as rapidly as is consistent with the various conditions that may affect every individual farm. In this connection it should be said that the

question of the proper organization of the farm does not depend on the means of the new owner. The company keeps enough capital in reserve to provide the necessary working capital to begin with and to put in the necessary improvements to adequately shelter the livestock. This of course is added to the buyer's indebtedness subject to the terms of the contract as stated heretofore, or if he is able to make a fairly large initial payment on the farm, arrangement is made with him so that enough of this payment is reserved to provide him with the necessary working capital. This, then, does not leave any handicap to the immediate procedure with such a program as may seem the most profitable to pursue in the proper organization of every farm and naturally brings into prominence a number of problems in farm management.

Our major problems in farm management have presented themselves as follows:

1. The Selection of the Farm.
2. The Distribution of the Investment.
3. The Farm Layout.
4. The Selection of Enterprises.
5. The Distribution and the Adjustment of Enterprises.
6. The Labor Schedule.

THE SELECTION OF THE FARM.

Under this scheme of land settlement as well as for the individual farmer, the selection of the land is very important, for the inherent productivity of every farm bears a direct relation to the success and expansion of the business, so when selecting a farm careful consideration is given to the following factors:

1. The soil, its type, fertility condition, drainage condition.
2. Amount of waste land which cannot be reclaimed.
3. Distance from market.
4. Distance from school and church.
5. Condition of roads and distance from state and national highways.
6. Condition of improvements.
7. Condition of water supply.
8. Amount of land which can be used for permanent pasture.
9. Approximate amount of capital required for the investment in working capital and improvements to affect a proper organization of such a type of farming as would be best adapted to the farm.

Sometimes the price asked for the farm is such as to prohibit the

addition of more capital for improvements and proper equipment without over-capitalizing the business.

The selection of the farm is a primary and determining step in farm management for the prospective farmer or for the one who wishes to change location. This phase of farm management therefore must be highly emphasized and the problem analyzed in detail into its various factors so that the value of a given farm can be pretty well established and the type of farm organization best adapted to it can be determined.

THE DISTRIBUTION OF THE INVESTMENT.

In farm organization the proper distribution of the capital is fundamental and the solution of this problem naturally follows the question of the selection of the farm. In this respect the farmer as well as the manufacturer is dealing with the three fundamental factors of production, namely, land, labor, and capital and it is the proper adjustment of these factors that is sought in an ideal distribution of the factors of production.

The adjustment of the factors of production in a farm business however is affected by various conditions which change from time to time so that a mathematically accurate distribution of the investment is probably impossible to obtain, and if obtained it would not remain so very long because of the changes in land values, in labor costs, and in the cost of equipment that are continually taking place. The efficient farm manager, however, will see that the distribution of the investment is correct within certain reasonable limits and he will also make adjustments in accordance with changing economic conditions.

The factors of production of any farm business may be analyzed as follows:

The Factors of Production.

- I. Land.
- II. Labor.
 - 1. Man Labor.
 - 2. Horse Labor.
- III. Capital.
 - 1. Fixed Capital.
 - a. Buildings.
 - b. Fences.
 - c. Wells and Water Works.
 - d. Tile Drains.
 - e. Irrigation Ditches.

2. Working Capital.
 - a. Work Horses.
 - b. Farm Implements and Machinery.
 - c. Productive Livestock.
 - d. Feeds and Seeds.
 - e. Cash.

In studying farm organization in North Dakota it appears that its most outstanding weakness is that the land represents too large a percentage of the total investment. This is apparently due, first, to the fact that among the earlier investors in farms there the tendency was to buy large tracts of land presumably due to its cheapness. Second, that the majority of North Dakota farmer immigrants have later and up to the present time come to the state with grain farming predominantly in mind and have invested nearly all of their available cash and credit in land and many of them have consequently been handicapped for the want of working capital. When lands were cheap the investment in large tracts did not necessarily mean at that time that the distribution of the capital was much out of proportion. However, the proper adjustment in the organization of the farm business that should have conformed with the changing economic conditions have failed to take place and this is probably the greatest weakness to-day in North Dakota's scheme of farm management.

Farmers, whether they are operating small or large businesses, must consider themselves in the rôle of managers, and their success will depend upon how well they can combine their land, their labor and their equipment into an efficient productive unit. This leads to a number of questions and problems. Just what extent of labor and tillage of soil will bring the highest efficiency? Just what is the proper proportion of machinery, work horses, productive livestock, improvements, labor and land to combine to secure the greatest efficiency? And if these factors are adjusted at one time they must be readjusted to conform to new economic conditions. If labor costs rise, it pays to add more machinery and to plan the whole system of management so as to use the labor as efficiently as possible. This may also make it profitable to reduce the cropping area and increase the number of livestock units and thereby increase the practice of pasturing off crops.

Livestock and the quality of livestock and its relation to the most efficient organization of the farm business is fundamental. In the farming of virgin and practically new land in North Dakota livestock has occupied no place of importance as an enterprise but as the

process of farming goes on the manager begins to see the necessity of summer tillage to clean the land and the raising of grass and legume crops to restore the humus and in so doing he resorts to the raising of corn and grasses, and in order to create a market for those crops he resorts to livestock. This leads to the following premises:

1. If practice is to form a basis for conclusions, the value of livestock as an enterprise in connection with tillage and farming of new lands is doubtful.

2. When the cultivation of the soil has reached a point where the presence of weeds and the reduction of humus and fertility necessitate summer tillage and the production of grasses and legume crops and the addition of manure, enough livestock should be secured to consume the roughage so raised and further to utilize the straw and other refuse so that the manure resulting from the same can be returned to the land. This is the first step in the efficient utilization of the labor, land and crops. At this stage of the business the quality of the livestock and the investment which it represents should be in accordance with the quality of the feeds raised and the value of the land.

3. As the value of the land increases and labor and equipment costs rise, the quality of the livestock should be raised accordingly, for to use high-priced land and high-priced labor in the production of low quality livestock is just as wasteful as it would be to use high-priced labor and equipment in the tillage of land of known low productivity.

THE FARM LAYOUT.

The development of the farm layout naturally comes under three divisions.

1. The layout of the farmstead.
2. The planning of the farm buildings.
 - a. Capacities of different buildings.
 - b. Interior arrangement.
3. The layout of the fields.

The practical farm manager desires to develop a layout that will give him the required building capacity, the most convenient and efficient interior arrangement, and a layout of fields that will be easily accessible from the farmstead and yet will conform in size and number to the size of the farm and the distribution of the crops desired. Would it not be of great value to the farm manager to have definite information bearing on the most economic and efficient building unit for given types and sizes of farms for his particular region?

THE SELECTION OF ENTERPRISES.

In the selection of crop and livestock enterprises we are guided by experimental data and the experience of successful farmers which I believe gives us a very reliable basis for the solution of this problem. However, much could be done in working out a more definite grouping of the varieties of grains the kinds of pastures and forage crops and the classes of livestock predominantly adapted to the different regions of a given state.

THE DISTRIBUTION AND ADJUSTMENT OF ENTERPRISES.

After the selection of enterprises comes the question of how much of each to raise. The crop enterprises must be planned to meet the following requirements:

1. To provide a good distribution of labor.
2. To provide an ample supply of the best feed crops that it is possible to raise under the prevailing conditions.
3. To provide for the conservation of soil fertility.
4. To provide for pastures.
5. To allow enough flexibility in the system of cropping so as to make it possible to readily increase the acreage of such crops as can be pastured off and to make such other changes as might be necessary to meet new economic conditions.
6. To provide for a definite percentage of cash crops.

The selection of livestock enterprises is largely a problem of relations, that is, their selection must be largely determined by the kinds of feed crops that can be raised, the inclinations of the farm owner, the size of farm and the amount and quality of labor under control of the manager.

The selection of enterprises, their distribution and adjustment, therefore, is a problem which involves the most careful dovetailing together of the enterprises in such a proportion as will produce from every standpoint the most complete and efficient farm unit.

THE LABOR SCHEDULE.

Is it possible for a farmer who is more or less at the mercy of the weather to work in accordance with a labor schedule? Or putting it a little differently, would a labor schedule make it possible for him to use his labor more efficiently? Those who have studied this phase of farm management will likely answer in the affirmative, and if it is of much importance what are the determining factors that should be used as a basis in working out such a schedule? First: A normal

day's work for the various farm operations. Second: The average date on which the seasonal work begins, and should end and the average number of field working days in each season. Third: The latest date at which it is safe and beyond which it is unsafe to plant crops. Fourth: The proper order or sequence in the planting of the crops.

With such data at hand and knowing the size of his farm and having determined what and how much to raise the farm manager can plan pretty definitely what his labor requirements will be in the field and much of the miscellaneous work can be done when weather conditions prevent the performance of field work.

It appears, therefore, that a carefully worked out labor schedule would have a tendency to make the farm manager adjust his farm operations with his labor supply and he would consequently avoid prolonging his seeding and planting operations beyond the latest average date at which it is safe to sow or plant, all of which combine to make his labor more productive.

These problems and other problems are far from being solved and we look to the investigational agencies of the agricultural colleges and the United States Department of Agriculture to work out their solution and to the extension agencies in disseminating the information in usable form. If farm management presupposes a knowledge of all phases of farming, and if it is a science which has for its purpose the coördination of all the factors of a farm business to the end that the most profitable and the most efficient farm unit may be evolved, then it must occupy a position of eminence and be given the means and latitude for consistent practical development commensurate with its importance.

I do not believe that we will have developed the most practical and the most usable information in farm management until every investigational agency or institution is working in accordance with a project that is consistently planned, first to solve the major problems, second to determine the type or types of farm organizations that is the most efficient productive unit and third, the testing and improving of the principles involved in such types of farm organization on farm management laboratory farms to be operated under the supervision of the agricultural colleges. Records representing the average accomplishments of the most successful farms in a given community do probably not represent the highest attainment in farm efficiency and there may be need of confirming and even attempting to improve upon the principles established by such records.

SOCIAL SIGNIFICANCE OF HIRED LABOR SMALL HOLDINGS AND SMALL FARMS.

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The demand for labor in urban centers has of late made serious inroads in the available supply of unmarried farm hands and has stimulated, to some extent, the building of houses for married hired men. Numerous land settlement schemes have advocated the building of a house with an acre or two of land for the rural hired man. This may be an admirable scheme to increase population in new regions where the labor supply is scarce. In the older and more settled regions such a policy would probably be very unfortunate.

The general custom in the northern half of the United States is that the hired man shall not marry until he has started farming and this article presupposes that future tenants will be selected from the present hired men. There are at least two causes for this. First, the lack of housing facilities on the farm, and second, an effective incentive for accumulation of capital on the part of some hired men. These circumstances are a distinct and positive check on rural population.

The first proposition is relatively simple. It has been the custom in the northern part of United States for the unmarried laborers to lodge and board with their employers. The operating owner is thus confronted with an economic problem. If he brings the laborer into his own home his household expenses will be somewhat greater, and the duties of his wife will be increased. If he does not make the hired man a part of his family then he must build a second house and secure the services of a married man. Assuming that he can get either kind of help he desires, the operator must then weigh the expense of repairs and insurance, depreciation and interest on the house to be built and a slightly higher nominal wage against the increased household expenses and the inconvenience due to the presence of the hired man.

In general, the farm produces a considerable portion of the daily food consumed, and the presence of one more mouth adds but little expense. Further, the operator is at very little extra expense to

house the laborer when the hired man becomes a part of the family. Past experience indicates that it is more economical to bring the hired man into the family circle. New barns, fertilizers, new machinery, education of the children seem, in the light of past experience, to be the more important considerations. The hired man's house seems to be the last addition to the farm. When the operator has sufficient capital to invest in the form of tenant houses the operator usually moves to town and rents his farm. Assuming that there are married and unmarried men to be employed, the tendency has been to employ the latter. This economic tendency on the part of the operator prevents the laborer from marrying during the hired-man stage, and is a positive check on population.

The second restraint on rural population in this region is an effective desire on the part of some young laborers for the accumulation of capital. As has been brought out in the previous discussion, it is cheaper for the operator to take the hired men into the family than to build more farm structures to house hired labor. This is particularly the case where building materials are scarce and relatively high priced.

From the point of view of the laborer, is a married or unmarried state more desirable from a purely economic standpoint? If a young hired man marries, his productivity as a laborer is not increased while his expenses of living have increased. He supports two instead of one, and there is no added revenue. Usually the operator is willing to pay the married laborer a larger wage than the unmarried man. The difference, however, does not compensate for the cost of his own board, not to mention that of his wife. Consequently, although the nominal wage of the laborer is greater, the real wage is less. In rural communities to-day we find many men who have married and started a family before they passed from the hired-man stage to the tenant stage and are still hired men. Seldom does a young man marry and start farming and then revert to the hired-man state. Ostensibly, then, where there exists an effective desire for accumulation of capital on the part of the laborer, in order to start farming, there is a positive check on population. As soon as the farm hand has sufficient means to start farming as a renter, a wife is an economic necessity. Rarely do men start farming without a helpmate. In a few instances, a mother or sister may take the place of a wife. The previously mentioned restraints on population now no longer exist, and the Malthusian law seems to operate with remarkable exactness. The rapid increase in population is due to (1) persistence of the procreative

force, (2) an abundant supply of cheap food, and (3) the income to be secured from the children as they advance into the productive age. The fact that the presence of the first tends to an increase in the number of children beyond the limits of subsistence need not be discussed here. The second is that the abundance of cheap foods relieves the check on population due to the high cost of living in urban centers. The products of the garden stock and farm crops in some cases have no value and in other cases have a value far below the wholesale or retail prices of such commodities in our urban centers. In other words, the cost of rearing rural children is relatively low.

The third factor, the importance of the income in the form of unpaid labor, may need elucidation. If the young operator owns no land, but possesses a little capital in the form of machinery, stock or supplies, his income from capital is relatively unimportant when contrasted with other sources of income. There are only two sources of income left, wages and entrepreneurial profits. Since agriculture is an individualistic and a conservative occupation, the entrepreneurial profits are low. In the case of share tenants, the first stage through which most young men pass as farmers, the landlord secures a portion of this entrepreneurial profit. The net result is that the source of living and accumulation must largely come from labor. Consequently, the tenant resorts to many methods to decrease the expense of hired labor and increase the income from his own or family labor. It takes little originality to perceive that a combination of the presence of a strong procreative force, an abundant supply of cheap food and the economic necessity of unpaid labor tend to produce a condition under which rural population increases very rapidly.

The author admits the presence of checks which tend to vitiate this apparently crass doctrine. However, when a young man starts farming and is heavily in debt he is confronted with an economic proposition. If he increases his family he can reduce the indebtedness somewhat faster and accumulate capital more rapidly and later leave the children a respectable inheritance, a deferred payment for services previously rendered. The other alternative is that the operator rear a smaller family, which results in a slower reduction of the farmer's indebtedness, which, in turn, of course retards the accumulation of capital and leaves a smaller inheritance to his offspring. It is readily conceivable that the inheritance per child in both cases will be approximately equal. Assuming such a condition to exist, which method of procedure will the young man follow? The former will tend to prevail as it will give the operator greater economic advantage dur-

ing his life. Although this appears to be a harsh discourse, it has its bright side. The hired man who becomes a farm operator usually does not start farming until he is relatively mature, late marriages usually meaning smaller families.

The landlord, in choosing tenants, always looks for the most industrious and conscientious hired man who has accumulated sufficient capital to start farming. That is the young man whom the landlord feels will be able to produce for him the largest return. This selection is, consequently, a very efficient check upon population and eliminates the unfit, leaving the control of the rural population in the hands of those most capable of caring for it.

The question may then be raised concerning the effect of size of farm on population. Table I presents the relation between size of farm and the number of children under sixteen years of age on farms in northern Illinois. The correlation coefficients (r) exhibited in Table I do not permit the assertion of a significant correlation between the two phenomena in question. The size of farm does not seem to be a factor affecting the number of children under sixteen years of age.

Table II presents the relation of size of farm and the number of children over sixteen years of age. The correlation coefficients (r) presented in Table II indicate the presence of positive significant correlation for the factors in question for all groups of operators. In the case of operating owners, the correlation coefficient is six times the probable error, part owners, five; cash renters, nine; share tenants, four, and all tenants, ten.

The one factor, the number of children on the farm under sixteen years of age, is not influenced by the size of farms; the second factor, the number of children on the farm over sixteen years of age, varies with the size of farms.

The stimulation of very small holdings or the utilization of married farm labor to replace the dwindling unmarried farm labor has great social significance. Married farm hands rarely become farm operators as it is almost impossible to accumulate sufficient capital. Again, the utilization of unmarried hired labor on the farm is not only a positive check on population as it prevents indiscriminate marriage in a place with cheap living conditions but slowly and surely is a very effective selector of population as the landlords looking for tenants to operate their farms choose those who are industrious and have capital. Very small holdings in the older districts are in practically the

same economic state so far as progress is concerned as are the married hired men.

The data in Table I indicate that size of farm bears no relation to the number of children under sixteen years of age. The same would probably hold true for small holdings of two or three acres and for the married hired man. Large farms tend to hold the children on the farm after they have become more productive. Small farms, small holdings and a married hired labor state forms a breeding ground with cheap food for the production of urban labor. The last two, small holdings and married farm labor, do not in any way produce a selective population.

TABLE I.—*Correlation between size of farm and the number of children per farm under 16 years of age and the means and variables for the number of children under 16 years of age for farms operated by owners, part owners, cash renters, and share renters. 680 farms.*

Groups of Operators.	Means and Variables for the Number of Children Under 16 Years of Age.			
	<i>r.</i>	<i>M.</i>	<i>δ.</i>	<i>C.</i>
Owners.....	.009 ± .042	1.879 ± .078	1.941 ± .057	103.299 ± 5.368
Part owners.....	.137 ± .103	1.732 ± .182	1.500 ± .112	86.605 ± 10.199
Cash rent.....	.065 ± .044	2.343 ± .104	1.923 ± .060	82.074 ± 3.954
Share rent.....	-.131 ± .055	2.214 ± .124	1.883 ± .073	85.050 ± 5.269
All tenure.....	.027 ± .026	2.099 ± .054	1.914 ± .035	91.186 ± 2.723

TABLE II.—*Correlation between size of farm and the number in the family over 16 years of age and the means and variables for the number in the family over 16 years of age for the owners, part owners, cash renters, and share renters. 680 farms.*

Groups of Operators.	Means and Variables for Number in Family Over 16.			
	<i>r.</i>	<i>M.</i>	<i>δ.</i>	<i>C.</i>
Owners.....	.257 ± .039	3.227 ± .134	1.467 ± .043	45.460 ± 1.586
Part owners.....	.457 ± .083	3.195 ± .337	1.469 ± .109	45.978 ± 4.085
Cash rent.....	.377 ± .038	2.548 ± .113	1.065 ± .033	41.797 ± 1.526
Share rent.....	.220 ± .053	2.828 ± .158	1.288 ± .051	45.545 ± 2.146
All tenure.....	.246 ± .024	2.910 ± .075	1.339 ± .024	46.013 ± 1.005

1. *r* = Correlation coefficient and represents the interrelation of certain phenomena that tend to move with certain continuity. If certain characters increase in proportion to one another, then the rate is perfect and is indicated by 1. If one character increases and the other exhibits a proportional decrease the correlation is -1. If there is no correlation present the coefficient is 0.

2. *M* = Mean, which is the expression of the value of a character and approximates the average.

3. *δ* = Standard Deviation, which is a measure of variability. The standard deviation does not measure the amount that some particular departure deviates

from any fixed standard. It is an excellent measure of variability of all the data in question from the mean.

4. C = Coefficient of Variability. Standard deviation is a measure variability applicable and comparable to the data in question. The coefficient of variability is an abstract measure of variability which affords an accurate method of comparing the variability of unrelated phenomena. Illustrations of such coefficients are as follows:

Phenomena.	C
Corn length of ears	7.8 ± 0.2
Corn weight of ears	33.2 ± 0.4
Feeding Steers	$45.3 \pm ?$
Size Farms	42.8 ± 1.3
Farm Labor Income	230.6 ± 7.3
Bacteria Counts	$297.1 \pm ?$
Length of noses	$9.5 \pm ?$
Number of Children under 16	91.2 ± 2.7

Farm Labor incomes and bacteria counts are much more variable than length of human noses or weight of ears of corn. High variability does not vitiate conclusions that may be drawn from carefully prepared data.

5. \pm . Some numbers represents the probable error, which gives us a barometer of the accuracy of the data in question. If the measure in question is more than three times the probable error considerable reliability can be placed in the data. For instance in Table I the correlation between size of farm and number of children under 16 years of age for all tenure is .027 and the probable error is .026. As the coefficient .027 approximates zero, the probable error is almost as large as the correlation coefficient \pm the correlation ($.027 \pm .026$) has no significance and indicates no tendency for any relation between size of farm and age of children under 16 years.

In Table II the correlation between size of farm and children over 16 years of age for all tenure is 0.246 ± 0.024 . The correlation coefficient 0.246 is positive; that is as size of farms increases there are more children over 16 years of age per farm. The fact that the coefficient (.246) is ten times the probable error (.024) indicates beyond a doubt that the correlation is significant.

THE HORSE AND THE FARM TRACTOR.

D. S. Fox,

STATE COLLEGE, PA.

The same economic forces that caused the horse to supersede the ox as a source of farm power in the nineteenth century are now working to displace the horse with the tractor. The tractor has proved its value on the American farm. But whether it will ever displace a majority of the farm horses depends upon economic conditions and further developments in the tractor world.

The power that will enable the farmer to produce the most at the cheapest cost is obviously the power that will survive. A comparison of the horse and the tractor may be made on the following basis:

1. Economy.
2. Efficiency.
3. Adaptability.

ECONOMY.

The average annual cost of a farm tractor on 54 farms in Pennsylvania in 1917 was \$495.62, or, including the labor of operator, \$622.12.¹ As far as the farm business is concerned, these figures are of little value until we know how the farm business is affected. It is evident if the tractor is to be a good business proposition that this additional cost must be met with a corresponding decreased cost in some other part of the business. A tractor may be able to plow at half the cost of doing the same work with horses and still be a poor business proposition if the horses were to stand in the barn while the tractor worked.

The principal factors affecting economy are number of horses displaced, feed and other saving on remaining horses, and labor saved. The 1917 Pennsylvania data on farms raising the same acreage of the various crops as before purchasing the tractor showed a displacement of 1.8 horses. Preliminary figures for 1918 on somewhat smaller farms show a similar displacement of 1.5 horses. The number of horses displaced depends upon the size of the farm and the kind of

¹ Bulletin 158, Pennsylvania State College.

work to be done. On large farms, the tractor can displace more horses than on small farms. If the tractor does not reduce the burden on the horses at the time when the horse labor is busiest, no horses can be disposed of. In other words, if it is necessary to keep horses sufficient for the farm needs to do the work of a certain season, a tractor would be unnecessary and unprofitable. If the tractor can do the work of the rush season, then a part of the horses may be sold.

Besides getting along with less horses, the tractor owner may save in feed and other costs on the remaining horses. If the tractor does the heavy work, the horses will require less feed for the remaining lighter work. The Pennsylvania 1918 data show an annual saving of feed on the remaining horses of \$59.40 per farm.

The tractor does work faster than horses and thereby saves man labor on many kinds of work. Some farmers hire less help while others have more time for other work. The 1918 Pennsylvania data on farms having the same organization since buying the tractor show a saving of three months of labor because of the tractor. Current 1918 wage for labor without board for the section studied was about \$60 per month. Thus, three months of labor worth \$180 were saved.

The situation of these farms may be summarized as follows:

Annual cost of tractor (1917 data)	\$495.62
Labor saved (1918 data)	\$180.00
Feed saved (1918 data)	59.40
Balance to offset cost of horses displaced	256.22
Cost of tractor operation per horse displaced.....	170.81

The net cost of keeping a horse in New York State as shown in U. S. D. A. 560 for 1911 to 1914 inclusive was \$145.02. Since that period, there has been a sharp increase in the cost of keeping a horse. Unquestionably, the tractor is a profitable proposition on these farms.

EFFICIENCY.

The tractor has proved its efficiency in a variety of farm work. The term efficiency is here taken in the broader sense of the farm as a unit. If the tractor can improve the efficiency of the farm, its use is justified even though it is not accompanied by a decrease in cost. The farm efficiency may be improved by doing the work in the optimum season, by changing the organization to accommodate a more profitable combination of enterprises, by increasing the magnitude of business either by larger acreage or more intensive enterprises. In

the same way that the gang plow, the mower, the binder and similar implements have increased the production per man the tractor can increase the farmers' efficiency. This has been a large factor in the rapid increase in the number of tractors on farms. The full development hinges on the development of more suitable tractor machinery.

ADAPTABILITY.

The displacement of the horse to any full extent depends upon the adaptability of the tractor to all kinds of farm work. The horse is a flexible source of farm power, useful singly or in teams of two or more, and dependable under almost all conditions that the farm demands. The tractor, while its performance has been almost unbelievable, has not proved its superiority to the horse as an all around farm power. But, as necessity is the mother of invention, if there is an economic justification we may expect rapid strides in this direction.

Farm Management Extension Conference.

A conference of the Farm Management Demonstrators from the Northern and Western States was held in Washington, June 15 to 22. Twenty-five of the thirty-three Northern and Western States were represented and four of the Southern States had representatives present. Among the speakers outside of the States Relations Service and Office of Farm Management were Professor G. F. Warren of Cornell University, who talked on "Probable Future Trend of Prices" and "The Choice of Farm Enterprises Based on Prices"; Professor Andrew Boss of the University of Minnesota, who talked on "The Choice of Crop Enterprises Based on Returns for Labor" and "The Choice of Farm Enterprises Based on Labor Requirements"; Dr. Francis Walker of the Federal Trade Commission, who discussed the "Theory Concerning Cost of Production Studies"; and Dr. B. H. Hibbard of the University of Wisconsin, who discussed "Farm Credits" and "Marketing of Farm Products." A number of the men in Washington discussed various extension and investigation topics. Considerable time was spent in round table discussion of topics relating to the work of the farm management demonstrator. It was the consensus of opinion of the men present that a full and profitable week was spent at the conference.

REPORT OF THE COMMITTEE ON TEACHING FOR THE YEAR 1919.

Your committee has made a study of the courses in agricultural economics, farm management, and allied subjects offered primarily for undergraduate credit in the various institutions.

A questionnaire was sent the land grant college in each of the forty-eight states. Inquiry was made regarding the following courses listed under fifteen titles in common use:

1. Agricultural Economics—General Course.
2. Economic Problems in Agriculture.
3. Economic History of Agriculture.
4. Land Problems, Tenure, Etc.
5. Agricultural Statistics.
6. Agricultural Coöperation.
7. Agricultural Finance.
8. Farm Accounting.
9. Farm Cost Accounting.
10. Farm Management—General Course.
11. Farm Organization.
12. Farm Operation.
13. Types of Farming, Systems of Farming.
14. Agricultural Surveys.
15. Agricultural Law.

The following questions were asked regarding each of the courses listed:

1. The number of credit hours offered for the course.
2. If the course is not offered, do you feel the need of such a course?
3. Do you expect to offer such a course?
4. If so, when?

Forty-three of the forty-eight colleges addressed made reply to the questionnaire. The following general conclusions are drawn from the facts set forth in the tabular summary of the replies received:

1. There seems to be a considerable degree of uniformity as to the titles of the courses offered.
2. There is a high degree of uniformity as to the number of credit

hours offered for the various courses, especially with reference to a few of the more general fundamental courses. For example: of the 34 states reporting general courses in Agricultural Economics, 20 give 3 hours of credit; of the 36 states reporting general courses in Farm Management, 22 give 3 hours of credit; and of the 14 states reporting courses in Farm Organization, 10 give 3 hours of credit.

3. A majority of the institutions reporting are already offering from 6 to 10 different courses in agricultural economics, farm management, and allied subjects. On the average, approximately 3 credit hours are given for the various courses offered.

4. Many of the institutions reporting indicate that they feel the need of several new courses in addition to those now being offered. This is particularly true in those institutions in which the teaching program is just beginning to be developed. A number give definite dates when they expect to begin offering certain new courses desired.

Your committee wishes to make the following suggestion and recommendations for the consideration of the Committee on Teaching for the ensuing year:

1. That a more detailed study be made of the general outline and content of the courses now being offered primarily for undergraduate credit in the various institutions.

2. That an effort be made to standardize the titles and content of the courses in agricultural economics, farm management, and allied subjects being offered in the different institutions.

3. That this inquiry be so planned as to include information regarding the regular texts, reference books, and collateral material which is being found most helpful in connection with the various courses.

Your committee feels that such a study would be desirable from the standpoint of establishing a more satisfactory basis for transferring credits from one institution to another. It should also contribute to a higher degree of uniformity and effectiveness in teaching agricultural economics, farm management, and allied subjects in the various institutions.

Respectfully submitted,

W. F. HANDSCHIN,

*Chairman, Committee on Teaching,
American Farm Economic Association.*

Summary of Data.

Report of Committee on Teaching.

General Title of Course.	No. of Insts. Now Offering the Course.	Range in Credit Hours.					Av. Cr. Hrs.	No. of Insts. Feeling the Need of the Course.	No. Intending to Offer the Course.	When, Cr. Hrs.
		1.	2.	3.	4.	5.				
1. Agricultural Economics, General Course.....	34	3	2	20	5	4	3½	4	1	1923
2. Economic Problems in Agriculture.....	8	1	1	4	3	4	4	6		
3. Economic History of Agriculture.....	15	5	7	1	1	1	3	6	2	1920
4. Land Problems, Tenure, etc.....	9	4.	2	2	2	2	2½	7	1	1920
5. Agricultural Statistics.....	6	2	2	2	2	2	3½	9	2	1920
6. Agricultural Cooperation.....	17	6	7	7			2½	7	2	1920
7. Agricultural Finance.....	8	3	3	3			3	7	2	1920
8. Farm Accounting.....	20	9	6	6			2½	4	2	{ 1920 1923
9. Farm Cost Accounting.....	17	9	9	9			3	3		
10. Farm Management, General Course.....	36	22	5	5			3½		1	—
11. Farm Organization.....	14	3	10				3	3		
12. Farm Operation.....	5	1	4				3			
13. Types of Farming, Systems of Farming.....	9	5	2				2½	4		
14. Agricultural Surveys.....	5	5	5				3	4	1	1920
15. Agricultural Law.....	11	7	4				2½	10	1	—
16. Marketing.....	17	6	8				3		1	—
17. Miscellaneous Agriculture.....	7	3	2			1	2½			—

EDITORIAL NOTES.

The Secretary of the Association makes the following financial report with a feeling of optimism which may not be expressed in the figures presented:

The past six months has been a difficult period in which to obtain new subscriptions because of the economic pressure that confronts each individual in the payment of necessary obligations. It is also appreciated that there are a number of journals of various kinds which each of us would like to subscribe for but there must be a limit drawn because of the shortage of available funds for that purpose. We do feel that it is essential that each member of the Association do his best to interest others, whom he feels will profit by the investment, in joining the Association and subscribing for the JOURNAL. The Secretary is attempting to keep in touch with the key subscription member in each State who has agreed to push the membership in his State.

The particular difficulty that may confront the Association at the end of the year is caused by the increased cost of printing the JOURNAL. This has increased twenty-five per cent within the last six months and further increases are indicated. This means that it will be necessary to obtain at least two hundred members to maintain the Association free from debt this current year. A reasonable response to the second notice for the payment of dues has been received but there are about 185 old members who have not paid the \$2 fee for the present year.

FINANCIAL STATEMENT. (Approximate, to July first.)

Cash on hand November 14, 1919	\$250.00	
Total receipts to date	<u>820.00</u>	\$1,070.00
Total expense (including back bills)	<u>\$749.00</u>	
Total bills payable (estimated)	<u>450.00</u>	\$1,119.00
Deficit July 1st		\$ 129.00
Number of new subscribers obtained during 1920	70	
Number of old members not paid	185	
Estimated number of new members yet to be obtained to leave a surplus in the treasury at the end of the year	100	

This pessimistic report will be turned into a decidedly optimistic surplus with the old members paying up and one hundred new ones added.

NEWS ITEMS.

Mr. D. S. Fox, formerly of State College, Pennsylvania, has given up his work in Farm Management at the latter institution and has accepted a position with the Extension Service of the University of California. His new address after July 1 will be 438 Court Street, San Bernardino, California.

Mr. Frank H. Gulick, formerly of Winfield, Kansas, in sending us his change of address, states that he is now engaged with the Home Study Service of the Kansas State Agricultural College, and will give especial attention to the Animal Husbandry work. A goodly number of farmers in Kansas, as well as people in other States, are taking the correspondence work with this institution.

Mr. E. L. Taylor, formerly Assistant Farm Management Demonstrator in Nebraska, has returned to the work as Farm Management Demonstrator succeeding Mr. P. K. Whelpton in Nebraska.

Mr. J. S. Donald who has been operating his own farm in Wisconsin and was Secretary of State 1913-1917 has been appointed Farm Management Demonstrator in Wisconsin. During the war Mr. Donald was identified with Y. M. C. A. work among A. E. F. and served as an agricultural instructor in the college work in France.

Mr. H. M. Eliot, formerly Chief, Economics Division, A. & M. College, Texas, has been appointed Farm Management Demonstrator in Michigan, succeeding Mr. C. H. Graves who resigned to take a position as farm manager near Pontiac, Michigan.

Mr. A. F. MacDougall, a graduate of the Massachusetts Agricultural College and for five years County Agricultural Agent in Hampshire County, Mass., has been appointed Farm Management Demonstrator in Massachusetts.

Mr. M. P. Rasmussen, a graduate of Cornell University, has been appointed Farm Management Demonstrator in Vermont.

Mr. F. J. Chase, Farm Management Demonstrator in Montana 1915-1917, and who after spending two years over seas served as County Agent in Montana, has been appointed as Farm Management Demonstrator in Colorado succeeding Mr. O. S. Rayner who resigned to become Agricultural Agent for a Colorado banking company.